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The EUSO-SPB2 Cherenkov Telescope Instrumentation and Simulated Performance OSCAR ROMERO MATAMALA, NEPOMUK OTTE, ELIZA GAZDA, Georgia Institute of Technology, EVGENY KUTZENZOV, The University of Alabama in Huntsville, ELEANOR JUDD, Lawrence Berkley National Laboratory, PATRICK REARDON, The University of Alabama in Huntsville, Center for Applied Optics, JOHN KRIZMANIC, University of Maryland, Baltimore County, LAWRENCE WIENCKE, Colorado School of Mines — The detection of astrophysical neutrinos by IceCube and the potential to constrain source models of ultra-high energy cosmic rays (UHECRs) motivate the development of instruments for the observation of very-high energy (VHE) cosmic neutrinos. In the Earth-skimming technique for VHE (above 10^7 GeV) cosmic neutrino detection, a tau lepton produced in a tau neutrino interaction inside the Earth can emerge from the ground and decay initiating an upward going extensive air shower (EAS). This event can be detected by measuring its optical Cherenkov signal. UHECRs above the Earths horizon can be detected similarly. We discuss the development of a Cherenkov telescope for the detection of tau neutrino associated events and their background. This telescope will be deployed on the Extreme Universe Space Observatory Super Pressure Balloon 2 (EUSO-SPB2) as a precursor for the Probe of Extreme Multi-Messenger Astrophysics. The 1m diameter Cherenkov telescope for EUSO-SPB2 will have a focal plane comprised of silicon photomultipliers (SiPMs) coupled to a 100 MS/s readout based on the GET switch capacitor ring sampler. We present details of the development of the instrumentation and the simulated Cherenkov signal response.

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